PATENT COOPERATION TREATY

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FORSSEN & SALOMAA

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P1897PC00	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI2004/000713	International filing date *(day/month/year)* 24.11.2004	Priority date *(day/month/year)* 27.11.2003
International Patent Classification (IPC) or national classification and IPC See Supplemental Box		
Applicant Fortum OYJ et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *(sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s))
      _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:
   - ☒ Box No. I Basis of the report
   - ☐ Box No. II Priority
   - ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - ☐ Box No. IV Lack of unity of invention
   - ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - ☐ Box No. VI Certain documents cited
   - ☒ Box No. VII Certain defects in the international application
   - ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.06.2005	10-02-2006
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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Cover sheet

INTERNATIONAL PATENT CLASSIFICATION (IPC):

B01J 23/40 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000713

Box No. I Basis of the report

1. With regard to the language, this report is based on:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____ ,
which is the language of a translation furnished for the purposes of:

☐ international search (Rules 12.3(a) and 23.1(b))

☐ publication of the international application (Rule 12.4(a))

☐ international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

☐ the international application as originally filed/furnished

☒ the description:

pages 1-21 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 1-3 received by this Authority on 16-01-2006

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1-2 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☒ the claims, Nos. 1-7

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing *(specify)*: _____

☐ any table(s) related to the sequence listing *(specify)*: _____

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/FI2004/000713

Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-16	YES
	Claims		NO
Inventive step (IS)	Claims	1-16	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-16	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Reference is made to the following documents:

D1: US2001048970
D2: WO9110510
D3:Lashdaf M. et.al., Deposition of palladium and ruthenium beta-diketonates on alumina and silica supports in gas and liquid phase, Applied Catalysis A 241, 51-63 (2003)
D4: Dossi C. et.al., Chemical vapor deposition of platinum hexafluoroacetyalacetonate inside KL Zeolite: A new route to nonacidic platinum-in-zeolite catalysts, Journal of catalysis 145, 377-383 (1994)
D5: US6235962
D6: WO0040676
D7: WO0208156

The invention relates to a method for producing a nobel metal catalyst comprising the steps of pre-treating a zeolite with medium or large pore size, deposition of a nobel metal by gas phase deposition and a heat treatment. The nobel metals used in the production are platinum, palladium, ruthenium, rhodium, iridium and mixtures thereof. The invention relates to the use of said catalyst and production of a middle distillate diesel fuel.

Document D1 relates to a method for producing Pd/Au shell catalysts by chemical vacuum deposition, CVD (see section 19). As supports, it is possible to use inert materials such as SiO2, Al2O3, TiO2, ZrO2, MgO or mixtures of SiC and Si3N4 (see claim 4).

Document D2 relates to the use of saturating gas-solid

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

reactions in a gas phase process, for the manufacture of a heterogeneous catalyst. The main groups of catalysts are represented by zeolite supported zinc, alumina-supported rhenium and silica supported chromium. The process comprises an optional pre-treatment step wherein the support is heated (see claim 6). Then the surface activated support is contacted and allowed to interact with vapour containing the catalytically active species or its precursor, then optional after-treatment follows (see claim 1).

Document D3 relates gas solid reactions for the deposition of vaporised Pd and Ru beta-diketonates on alumina and silica supports (see section 2.1). The metals are deposited on a preheated support with nitrogen as carrier gas. After deposition the samples are reduced.

Document D4 relates to the decomposition of volatile organometallic precursors inside zeolites. Pt/KL catalysts are prepared from platinum hexafluoro acetylacetonate precursors (see Catalyst preparation). The support is pre-heated and the deposition is performed in a flow of argon. Subsequent decomposition is also performed.

Document D5 relates to heterogenous catalysts for ring-opening reactions of cyclic organic compounds such as naphtalene present in diesel fuel. The catalyst comprises catalytically active metal such as platinum on a carrier of alumina, silica or zirconia (see column 2, line 1-38). The hydrocarbons are introduced in a reactor under a pressure of 1 to 100 atm and a temperature from 450 to 670 K (see column 2, line 24-34).

Document D6 relates to the production of diesel fuel by ring-opening of naphthalene. Platinum on large pore crystalline zeolite (e.g. morderite) supports is used (see page 5, line 1-16 and page 6, line 10-16). Pressure ranges will vary from 400 to 1000 psi, and reaction temperatures will range from 288 to 370 C depending on the feedstock (see page 5, line 17-26).

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.
Continuation of: Box V

Document D7 relates naphthalene ring-opening catalysts comprising metals, such as platinum supported on inorganic oxides such as alumina or silica (see section 0025 and 0026). Preferred process conditions include temperatures from 150 C to 400 C and pressures from 100 to 3000 psi (see section 0029).

D2 is considered to be the closest prior art.

The method for manufacturing a catalyst according to claim 8 differs from D2 in that the nobel metals platinum, palladium, ruthenium, rhodium, iridium and mixtures thereof is used in the production. The problem to be solved by the present invention may therefore be regarded as producing a catalyst with high selectivity for ring-opening reactions. No teaching of specific catalysts that promote ring-opening reactions is suggested in D2 and non of the above mentioned nobel metals are suggested.

Therefore, claim 1 is considered to involve an inventive step. The use of said catalyst according to claim 15 and the production of a middle distillate diesel fuel in the presence of said catalyst according to claim 16 are also considered to involve an inventive step in view of the cited documents.

Accordingly, the invention defined in claims 1-16 is novel and is considered to involve an inventive step. The invention is industrially applicable.

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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Reference is in the description made to documents WO0008156, WO0008157 and WO0008158. However, it is assumed that the references instead should be WO0208156, WO0208157 and WO0208158.